Bioclimatic and Psychological Comfort Optimization in Coastal Eco-Lodges: A Multidisciplinary Intervention in The Gambia's Urban Coastline

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Abstract:
Coastal hospitality infrastructure in West Africa faces the dual challenge of severe environmental degradation—such as saline stress and coastal erosion—and the increasing demand for high-quality guest comfort. This paper presents a practical case study of a spatial and bioclimatic intervention implemented in an eco-lodge beachfront zone within the Gambian urban coastline. Integrating principles of forestry engineering, environmental psychology, and ergonomics, the project restructured the beach-to-property transition and the main restaurant layout. A protective perimeter barrier was engineered utilizing native, low-impact materials to establish privacy boundaries and mitigate wind-blown sand. Microclimate conditions and thermal comfort were enhanced through a redesigned vernacular shading system and the strategic introduction of highly salt-tolerant (halophytic) plant species to combat SCITE_1010202601 coastal erosion. Ergonomic pathways were optimized to improve spatial navigation and accessibility between the dining and coastal recreational areas. Preliminary post-occupancy evaluations indicate that using biophilic textures and structured zoning significantly reduces user environmental stress while enhancing thermal and psychological comfort. This intervention demonstrates that combining local forest products with psychological spatial planning provides a scalable, resilient model for sustainable tourism architecture in tropical coastal urban areas.

Keywords:
Bioclimatic Architecture, Environmental Psychology, Forestry Engineering, Ergonomics, Coastal Tourism, The Gambia.